Eigenfish Documentation

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Seth Pendergrass, Zhe Bai and Steven Brunton

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Contents:

CHAPTER 1

eigenfish package

1.1 Subpackages

1.1.1 eigenfish.classify package

Submodules

eigenfish.classify.classify module

class `eigenfish.classify.classify.`**`Classifier`**

Bases: `object`

`classify`(*data*)

Classifies data based on current model.

Parameters **`data`** – Matrix with each column a different sample.

Returns List of predictions, where return[i] describes data[:, i].

`cross_validate`(*data*, *labels*)

Cross-validates trained model against data with labels.

Parameters

- **`data`** – Matrix with each column a different sample.
- **`labels`** – List of labels, each corresponding to a column of data.

Returns Percent labels the same.

`load`(*filename*)

Loads trained model from file, overwriting current model. Do not use on training files you did not create.

Parameters **`filename`** – Name of file to load.

`save`(*filename*)

Saves trained model to filename.

Parameters **`filename`** – Name of file to save model as.

`train`(*data*, *labels*)

Trains current classifier with matrix data and labels, where labels[i] describes data[:, i].

Parameters

- **`data`** – Matrix of data, where each column is a separate sample.

- **labels** – List of labels, each corresponding to a column of data.

Module contents

1.1.2 eigenfish.process package

Submodules

eigenfish.process.math module

eigenfish.process.math.**fft2_series**(*img_mat*, *shape*)

For each column in img_mat, img_mat[:, i] the fft2 modes are extracted and placed into the corresponding column of the returned matrix.

Parameters

- **img_mat** – Matrix to process.
- **shape** – Original (width, height) of each column of img_mat.

Returns New numpy.ndarray matrix, where return[:, i] is the fft2 modes of img_mat[:, i].

eigenfish.process.math.**rpca**(*image_mat*)

Performs Robust Principle Component Analysis on image_mat.

Returns Low-rank, sparse parts of image_mat

eigenfish.process.process module

class eigenfish.process.process.**Processor**

Bases: object

process(*img_mat*, *shape*)

Process img_mat to prepare it for training/classification.

Parameters

- **img_mat** – Matrix with each column a flattened image.
- **shape** – Original (width, height) of each image.

Module contents

1.2 Submodules

1.3 eigenfish.eigenfish module

class eigenfish.eigenfish.**Eigenfish**(*shape*, *training_file=None*, *processor=None*, *classifier=None*)

Bases: object

classify(*img_mat*)

Classify img_mat based on current training.

Parameters **img_mat** – Column-wise matrix of flattened images.

Returns List of labels, one for each column of img_mat.

cross_validate(*img_mat*, *label_arr*)

Cross-validates the trained model. Img_mat will be run through the classifier, and each predicted label of img_mat[:, i] compared with label_arr[i]. The percent same is returned.

Parameters

- **img_mat** – Column-wise matrix of flattened images.
- **label_arr** – List of labels, where label_arr[i] corresponds to img_mat[:, i].

Returns Percent of labels that are the same.

load(*filename*)

Loads saved training data and overwrites current model. Use only on data you have previously saved, and make sure to use the same processor and classifier.

Parameters **filename** – File to load into classifier.

save(*filename*)

Saves currently trained model to filename.

Parameters **filename** – File to save from classifier.

train(*img_mat*, *label_arr*)

Add to current model's training.

Parameters

- **img_mat** – Column-wise matrix of flattened images.
- **label_arr** – List of labels, where label_arr[i] corresponds to img_mat[:, i].

1.4 eigenfish.util module

eigenfish.util.**load_img_mat**(*files*)

Loads all files as images in black and white, flattens them and returns them as a numpy.ndarray.

Parameters **files** – List of image files to load. All should be of the same resolution.

Returns Numpy.ndarray matrix with each column a flattened images.

1.5 Module contents

CHAPTER 2

Indices and tables

- genindex
- modindex
- search

Python Module Index

Index